

Appl. No. 10/624,406

Attorney Docket: 042390.P10735D

LISTING OF THE CLAIMS:

This listing of claims replaces all prior versions, and listings, of claims in the application:

- 1 1 (Original). A system comprising:
 - 2 a source of substantially spin-polarized electrons; and
 - 3 a medium which interacts with the spin-polarized electrons, the medium including a spin-dependent quantum well and a layer of semi-conductor material capable of emitting photons.
- 1 2 (Original). The system of claim 1, wherein the layer of semi-conductor material comprises a layer of N-type semi-conductor and a layer of P-type semi-conductor coupled so as to form a P-N junction.
- 1 3 (Original). The system of claim 2, wherein the P-N junction comprises an electron excited light emitting structure.
- 1 4 (Original). The system of claim 3, wherein the layer of semi-conductor material comprises Gallium-Arsenic (GaAs).
- 1 5 (Original). The system of claim 4, wherein the spin-dependent quantum well is substantially opaque to the photons emitted, during operation, by the layer of semi-conductor material.
- 1 6 (Original). The system of claim 1, wherein the spin-dependent quantum well comprises a layer of layer of magnetic material sandwiched between a first and second layers of spin mirror materials.
- 1 7 (Original). The system of claim 6, further including:
 - 2 a first layer of a electrically conductive material between the first layer of spin mirror material and the layer of hard magnetic material; and,

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4 a second layer of electrically conductive material below the layer of semi-conductor
5 material.

1 8 (Original). The system of claim 7, wherein the second layer of electrically conductive material
2 is substantially thin to allow photons emitted, during operation, by the layer of semi-conductor
3 material to pass through the second layer of electrically conductive material.

1 9 (Original). The system of claim 7, wherein the second layer of electrically conductive
2 material, at least partially, reflects the photons emitted, during operation, by the semi-conductor
3 material.

1 10 (Original). A method for reading the spin state of a magnetic domain comprising:
2 directing at the magnetic domain a beam of electrons substantially polarized in a
3 particular spin state; and
4 detecting the light emission state of a semi-conductor layer of the magnetic domain.

1 11 (Original). The method of claim 10, wherein detecting the light emission state comprises
2 capturing at least a portion of the emitted photons utilizing a sensitive photo-detector.

1 12 (Original). The method of claim 10, further comprising determining the state of the magnetic
2 domain, based in, part upon the light emission state.

1 13 (Original). The method of claim 12, wherein determining the state of the magnetic domain
2 comprises comparing the spin state of the beam of electrons to the light emission state of the
3 semi-conductor layer.

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1 14 (Original). The method of claim 12, further comprising trapping a portion of the beam in the
2 magnetic domain.

1 15 (Original). The method of claim 14, wherein determining the state of the magnetic domain
2 comprises determining what the state of the magnetic domain was prior to trapping a portion of
3 the beam in the magnetic domain.

1 16 (Original). A system for reading data comprising:
2 a source of spin polarized electrons;
3 a storage medium disposed a selected distance from the source and having a plurality of
4 storage locations, each storage location including a magnetic material and a layer of semi-
5 conductor material capable of emitting photons; and
6 a photo-detector to detect the emitted photons.

1 17 (Original). The system of claim 16, wherein the magnetic material of the storage location
2 includes a spin-dependent quantum well.

1 18 (Original). The system of claim 16, wherein the layer semi-conductor material of the storage
2 location includes a P-N junction.

1 19 (Original). The system of claim 16, wherein the layer semi-conductor material of the storage
2 location includes Gallium-Arsenic (GaAs).

1 20 (Original): The system of claim 16, further comprising a vacuum housing.

1 21 (Original): The system of claim 20, wherein the vacuum housing is at least partially
2 reflective, so as to facilitate the integration of the emitted photons.

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1 22 (Original): The system of claim 16, wherein the magnetic material of the storage location is
2 substantially opaque to the photons emitted, during operation, by the layer of semi-conductor
3 material.

Claim 23 – 30 (Cancelled).